REMARKS

Review and reconsideration on the merits are requested.

Turning first to the rejection of claims 11 and 12 under 35 U.S.C. § 112, second paragraph, specifically as being vague and containing "HLB", the specification and claims are amended to indicate this is the --hydrophilic-lipophilic balance--.

Withdrawal is requested.

Prior Art Considered: U.S. Patent 6,171,381 Yoshimura et al (Yoshimura); JP 10119425 (JP '425).

The Rejections: Claims 1, 2, 9 and 11 under 35 U.S.C. § 102(b) as anticipated by Yoshimura. Paragraph 6 of the Action.

Claims 1-16 under 35 U.S.C. § 103(a) as being unpatentable over JP '425 in view of Yoshimura. Paragraph 8 of the Action.

The Examiner's position is set forth in the Action in detail and will not be repeated here except as needed to an understanding of Applicants' traversal which is now presented.

Applicants first address the anticipation rejection over Yoshimura. Since the critical feature of the present invention is recited in claim 1, the patentability of claim 1 is first discussed.

The present invention provides a sizing agent comprising a water-soluble soybean polysaccharide as recited in claim 1 of the present application. With respect to the technical features of the present invention, the specification recites as follows.

> "In the present invention, the inclusion of a cationic polymer in the sizing agent is preferable to further improve the fixing and color development of ink. It is presumed that the water-soluble soybean polysaccharide attracts a cation of a

> cationic polymer having a minus-charged main chain, resulting in a pseudo-cross linking between the water-soluble soybean polysaccharide and the cationic polymer in the sizing agent as shown in Fig. 1. When only a cationic polymer is coated, most of the cationic polymer permeates into the inside of the paper. On the other hand, when a pseudo-cross-linked product of the water-soluble soybean polysaccharide and the cationic polymer is formed, the cationic polymer remains on a paper surface without penetrating inside the paper, resulting in improvement in ink fixing and color development even with a small amount of the cationic polymer (emphasis added) (see page 3, lines 12-24 of the specification).

Yoshimura discloses an aqueous metallic ink composition comprising a metallic powder pigment. a colorant, water and a water-soluble organic solvent, which further includes a natural polysaccharide and at least one compound selected from the group consisting of cellulose derivatives, a cyclodextrin, cyclodextrin derivatives, a water-soluble soy (soybean) polysaccharide and water-soluble soy (soybean) polysaccharide derivatives (column 2, lines 3-10).

In Yoshimura, the metallic powder pigment is coated by cellulose derivatives which are used together with the natural polysaccharide, whereby the cellulose derivatives can act effectively on the metallic powder pigment. In accordance with the teaching of Yoshimura, a carbonyl group and/or a hydroxyl group of the cellulose derivatives acts on the metallic powder pigment, whereby the hydrophilic characteristics of the metallic powder pigment are increased. To quote Yoshimura (column 2, line 35 et seq):

> "Then, the intimacy (linkage) between the metallic powder pigment and the colorant becomes strong. As a result, the colorant is caught or adsorbed by the metallic powder pigment, and then the absorption of the colorant into the absorbent surface is restrained."

Yoshimura thus teaches a metallic powder pigment composition comprising at least a metallic powder pigment, a colorant, water and a water-soluble organic solvent, and further

including a natural polysaccharide, and a water-soluble soy polysaccharide or water-soluble soy polysaccharide derivatives (Yoshimura at column 3, lines 56-61), wherein the metallic pigment preferably is coated by the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives which are used together with the natural polysaccharide, so that the water-soluble polysaccharide or water-soluble polysaccharide derivatives can effectively act on the metallic powder pigment. The water-soluble soy polysaccharide or water-soluble polysaccharide derivatives easily is/are absorbed in or linked by hydrogen bonding to the surface of the metallic powder pigment and the surface of the colorant, with the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives attaching the colorant to the metallic powder pigment (emphasis added) (see Yoshimura at column 4, lines 1-19).

Thus, in accordance with Yoshimura, the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives cannot be used independently, rather, must be used together with a natural polysaccharide selected from the group consisting of a microbial polysaccharide or derivatives thereof, a water-soluble vegetable polysaccharide or derivatives thereof, a water-soluble animal polysaccharide or derivatives thereof (see Yoshimura at column 4, lines 59-63). Further, the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives of Yoshimura may be added as a binder component for the metallic powder pigment and the colorant in order to enable the colorant to fix to the metallic powder pigment, particularly on an aluminum powder pigment, thereby restraining viscosity changes caused by the natural polysaccharide so that viscosity stability is insured (emphasis added) (see Yoshimura at column 6, lines 51-59).

When Yoshimura wants to adjust the pH within the range of 8.0-10, an anionic polymer is used in a amount of 0.01-5 weight % as a resin for pigment dispersion which provides dispersion stability by preventing aggregation of the pigment and helps forming the Yoshimura ink film (see Yoshimura at column 10, lines 21-23, column 10, line 66 to column 11, line 3, column 11, lines 14-17, and column 13, line 65 to column 14, line 3). Yoshimura does not use a cationic polymer to adjust pH (emphasis added).

Yoshimura thus fails to teach the critical feature of a sizing agent comprising a water-soluble soybean polysaccharide as recited in claim 1 of the present application.

Quite clearly claim 1 is not anticipated by nor rendered obvious by Yoshimura.

With respect to claim 2, although Yoshimura teaches that the water-soluble soybean polysaccharide is a water-soluble polysaccharide extracted from soybean or a soybean extraction residue such as OKARA (Yoshimura at column 7, lines 6-14), Yoshimura is silent regarding further treatment of the extract from OKARA, that is, subjecting the extract to desalinating purification. Therefore, claim 2 is not anticipated by nor suggested by Yoshimura.

With respect to claims 9 and 11, their patentability is clear from the above discussions concerning claim 1. Nevertheless, some comments with respect to claims 9 and 11 (surfactant usable in the present invention) are believed appropriate.

Claim 9 requires the sizing agent of claim 1, further contain a surfactant.

In the present invention, a surfactant is added to improve the water resistance of an image on recording paper. The reason why the surfactant improves the water resistance of the

recording paper is presumed to be that dye is insolubilized by the reaction shown in Fig. 2. Since the hydrophobic group in side chains of the water-soluble soybean polysaccharide has affinity for a hydrophobic portion of the surfactant, the surfactant attaches to the side chains of the water-soluble soybean polysaccharide such that the hydrophilic portion of the surfactant protrudes outward as shown in Fig. 2 (a). Since the hydrophilic portion of the surfactant becomes close to the hydrophilic portion of the dye (not pigment) contained in the ink, the dye also becomes close to the water-soluble soybean polysaccharide (Fig. 2 (b)). Thus, the dye is closely attracted to the cationic polymer pseudo-cross-linked with the water-soluble soybean polysaccharide, whereby the dye is insolubilized due to bonding of the cationic portion of the cationic polymer and the anionic portion of the dye (Fig. 2 (c)) (emphasis added) (see page 3, line 25 to page 4, line 12 and Figs. 2(a) - Figs. 2(c) of the specification).

In direct contrast to the above, Yoshimura simply teaches the possibility of using various types of surfactants in the Yoshimura aqueous metallic ink composition (Yoshimura, claim 11, line 66). However, Yoshimura fails to teach anionic, cationic, amphoteric or nonionic, etc., surfactants, and particularly fails to teach or suggest the use of a nonionic surfactant to improve image water resistance.

Quite clearly Yoshimura fails to teach any improvement in image water resistance produced regarding a recording paper coated or impregnated with a sizing agent comprising a water-soluble soybean polysaccharide and an added surfactant. Thus, claim 9 clearly is not anticipated or suggested by Yoshimura.

Claim 11 limits the sizing agent of claim 9, to a surfactant which is a nonionic surfactant having a hydrophilic-lipophilic balance (HLB) of from 5-15. Since Yoshimura is silent regarding a surfactant added to a sizing agent comprising a water-soluble soybean polysaccharide, claim 11 clearly is not anticipated by nor suggested by Yoshimura.

Withdrawal of the rejection of claims 1, 2, 9 and 11 is requested.

Applicants now address the rejection of all claims as obvious over JP '425 in view of Yoshimura.

JP '425 discloses, as discussed in the specification of the present application, at page 2, a plain paper for inkjet printing which is coated with a coating composition liquid comprising, as effective components, an artificial cationic polymer and a water-soluble resin. JP '425 uses an artificial cationic polymer having effective constituents of polymerized substances consisting of a skeleton of a (meta)acrylamide alkyl quaternary ammonium salt having a benzyl group to improve the water resistance of a picture upon inkjet recording (see the English abstract together with English translation of claims 1-5 and Paragraph No. [0001] of JP '425 attached hereto).

JP '425 is silent regarding a sizing agent containing a water-soluble soybean polysaccharide as an indispensable component for plain papers and a recording paper comprising a sizing agent as such (see the English translation of Paragraph No. [0041] of JP '425 attached hereto).

As a consequence, one of ordinary skill in the art, referring to JP '425, would clearly not reach the present invention as recited in claim 1 which calls for "a sizing agent comprising a

water-soluble soybean polysaccharide", and, accordingly, clearly the present claims are not obvious over JP '425 alone.

The rejection is, however, a combination rejection, the Examiner stating in Paragraph 8, lines 8-12 of the Office Action that:

> "It would have been obvious to add to the composition of JP '425, the polysaccharide of Yoshimura with the expectation of (a) improving resistance of the composition (as a size) to water (b) to maintain the density of color by minimizing penetration of colorant particles into substrate such as paper and (c) to enhance stability of viscosity. It would also have been obvious to add surfactant for improving wetting."

While it is not entirely clear whether the Examiner is stating that the independent addition of the polysaccharide of Yoshimura to the composition of JP '425 would result in one of ordinary skill in the art expecting effects (a) to (c) above, Applicants are nonetheless are quite convinced that the combination of JP '425 in Yoshimura does not render the claims herein obvious for the reasons now presented.

In Yoshimura the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives is/are not sizing components of the aqueous metallic ink composition, rather, may be added to the composition together with a natural polysaccharide as binder component for the metallic powder pigment (which, of course, is not soluble in water) and the colorant (pigment or dye) in order to enable the colorant to fix on the metallic powder pigment, particularly on an aluminum powder pigment. Specifically, in Examples 12-13 of Yoshimura, water-soluble soy polysaccharides 1 and 2 are assigned to the class Binder Resin for Coloring (emphasis added) (see Yoshimura at column 22, lines 40-48, column 23, Table 5).

The aqueous metallic ink composition containing both a natural polysaccharide and a water-soluble soy polysaccharide or water-soluble polysaccharide derivatives of Yoshimura makes it difficult for the colorant to penetrate into the absorbent surface (such as a drawing paper), whereby any decrease in density of color development at the ink film can be restrained (see Yoshimura at column 3, line 62 to column 4, line 1). It is important to note that the Yoshimura water-soluble soy polysaccharide or water-soluble polysaccharide derivatives can be replaced with a cyclodextrin or cyclodextrin derivatives having hydroxyl groups. A hydroxyl group of the cyclodextrin or cyclodextrin derivatives acts on the metallic pigment powder and the hydrophilic characteristic of the metallic powder pigment are increased in the same manner as with the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives (see Yoshimura at column 3, lines 6-31).

Thus, in Yoshimura a metallic powder pigment is coated with cellulose derivatives such as cyclodextrin or a cyclodextrin derivative and a water-soluble soy polysaccharide or water-soluble polysaccharide derivative so that the influence of metal ion on the natural polysaccharide can be restrained or prevented by controlling the elution of metal ion into the Yoshimura ink composition. Even though the Yoshimura ink composition contains cellulose derivatives, the aqueous metallic ink composition of Yoshimura has high stability in dispersion because the cellulose derivatives are used with a natural polysaccharide (emphasis added; see Yoshimura at col. 2, lines 55-63).

It is believed appropriate to analyze the mechanism involved in Yoshimura. Analysis of that mechanism establishes the basic and essential differences between the present invention and

Yoshimura and why the combination of JP '425 and Yoshimura could not result in the present invention. In more detail, the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives of Yoshimura is/are easily absorbed in or linked by hydrogen bonding to the surface of the metallic powder pigment and the surface of the colorant, whereby the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives attach the colorant to the metallic powder pigment. As a result, a writing with a vivid metallic color can be obtained. The aqueous metallic ink composition of Yoshimura thus has the ability to restrain viscosity changes and to maintain the state of a stable ink composition over time because of the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives (see Yoshimura at column 4, lines 17-19).

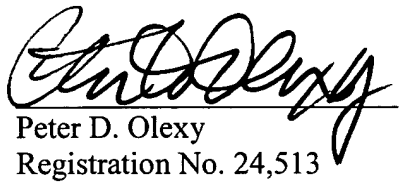
Considering the above, Applicants herein assume that factors (a) to (c) which the Examiner has referred to in Paragraph 8 of the Action might possibly be achieved due to the function of the water-soluble soy polysaccharide or water-soluble polysaccharide derivatives as a binder in the aqueous metallic ink composition of Yoshimura which contains both a natural polysaccharide and a water-soluble soy polysaccharide or water-soluble polysaccharide derivative, which will function to coat the metallic powder in Yoshimura, whereby the colorant penetrates into a drawing paper only with difficulty. However, the polysaccharide of Yoshimura does not in any manner function as a sizing agent in the Yoshimura aqueous metallic ink composition.

As a consequence, there would be no motivation for one of ordinary skill in the art, based on the combination of JP '425 and Yoshimura, to reach the present invention.

It is believed clear from the discussion above together with the earlier discussion that even if one of ordinary skill in the art were to combine JP '425 with Yoshimura, there is no teaching or suggestion of a sizing agent comprising a water-soluble soybean polysaccharide or of the combinations as recited in claims 3-10 and 13-16 or in amended claims 11-12 of the present application.

Withdrawal of all rejections and allowance is requested.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Page 11, delete the third full paragraph and insert the following new paragraph:

The nonionic surfactants used in the present invention preferably have an hydrophilic-lipophilic balance HLB of 5-15, particularly 7-13.

IN THE CLAIMS:

Please enter the following amended claims:

11. (Twice Amended) The sizing agent according to claim 9, wherein said surfactant is a nonionic surfactant having an hydrophilic-lipophilic balance (HLB) of from 5-15.

12. (Twice Amended) The sizing agent according to claim 10, wherein said surfactant is a nonionic surfactant having an hydrophilic-lipophilic balance (HLB) of from 5-15.